

# ADC-124

Analog to Digital Converter

## Owner's Manual



ADC-124-OM  
Version: 2.1

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## ADC-124 • HD/SD Analog to Digital Converter Owner's Manual

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## Important Regulatory and Safety Notices

Before using this product and any associated equipment, refer to the “Important Safety Instructions” listed below so as to avoid personnel injury and to prevent product damage.

Products may require specific equipment, and /or installation procedures be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

### Symbol Meanings



This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.



**Warning**

The symbol with the word “**Warning**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.



**Caution**

The symbol with the word “**Caution**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



**Notice**

The symbol with the word “**Notice**” within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.



**ESD**

**Susceptibility**

This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

### Important Safety Instructions



**Caution**

This product is intended to be a component product of the openGear™ frame. Refer to the openGear™ frame Owner’s Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as it’s component products.



**Warning**

Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing this area.



**Warning**

Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.

This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained within the product’s power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair.

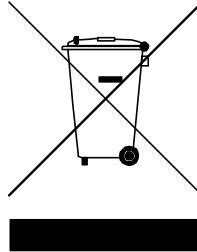
To reduce the risk of fire, replacement fuses must be the same type and rating. Only use attachments/accessories specified by the manufacturer.

## Environmental Information

**The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.**

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Sierra Video Systems encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Sierra Video Systems for more information on the environmental performances of our products.

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# Introduction

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## In This Chapter

This chapter includes the following sections:

- A Word of Thanks
- Overview
- Functional Block Diagram
- Supported Audio and Video Formats
- Documentation Terms

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## A Word of Thanks

Congratulations on choosing the openGear™ **ADC-124 Analog to Digital Converter**. The ADC-124 is part of a full line of modular conversion gear for broadcast TV environments. The Sierra Video Systems openGear™ line includes video decoders and encoders, audio embedders and de-embedders, distribution amplifiers, format converters, and much more. Sierra openGear™ modular conversion gear will meet your signal conversion needs now and well into the future.

Should you have questions pertaining to the installation or operation of your ADC-124, please contact us at the numbers listed on the back cover of this manual. We are happy to help with any questions regarding this or any other openGear™ card.

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## Overview

The **ADC-124** is a high quality analog to digital converter.

The product also provides full color processing control of the output video, with separate controls for Luma Gain, Luma Lift, Chroma Saturation and Color Phase.

All card configuration is done with a simple front panel menu. There is a four character text display to view and control parameters, and a toggle switch and two buttons to navigate the menu. Card configuration can also be done over DashBoard remote control software.

The input and outputs of the ADC-124 are the following:

**Input:**

- ❑ One 3-BNC dual-rate HD/SD analog video input

**Outputs:**

- ❑ Two dual-rate HD/SD-SDI video outputs

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## Functional Block Diagram

The ADC-124 has a very flexible signal flow path and feature set that combines several products into one compact package. This section diagrams the basic signal flow of your ADC-124 product.

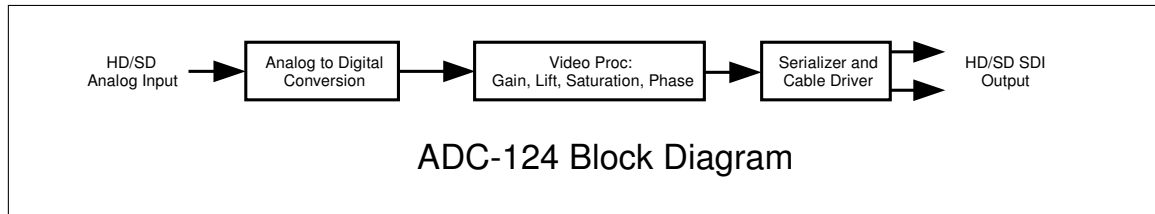


Figure 1. Simplified Block Diagram of ADC-124 Functions

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## Supported Audio and Video Formats

### Input and Output Video

The ADC-124 supports the complete range of modern SMPTE standard SD and HD video formats.

Raster structure	Frame Rate
1080psF	23.98, 24
1080p	23.98, 24
1080i <sup>1</sup>	25, 29.97, 30
720p	25, 29.97, 30, 50, 59.94, 60
486i <sup>1</sup>	29.97
575i <sup>1</sup>	25

Notes:

1. All rates displayed as frame rates, interlaced (“i”) field rates are two times the number shown.

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## Documentation Terms

The following terms are used throughout this guide:

- **“Frame”** refers to the **8310** frame that houses the **ADC-124** card.
- **“Operator”** and **“User”** both refer to the person who uses the **ADC-124**.
- **“Board”** and **“Card”** all refer to the **ADC-124** card itself, including all components and switches.
- **“System”** and **“Video system”** refers to the mix of interconnected production and terminal equipment in which the **ADC-124** operates.

# Installation and Setup

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## In This Chapter

This chapter includes the following sections:

- Static Discharge
- Unpacking
- Rear Module Installation (Optional)
- Board Installation
- BNC Connections
- Menu Structure
- Factory Defaults

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## Static Discharge

Whenever handling the card and other related equipment, please observe all static discharge precautions as described in the following note:



**ESD  
Susceptibility**

Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always exercise proper grounding precautions when working on circuit boards and related equipment.

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## Unpacking

Unpack each card you received from the shipping container, and check the contents against the packing list to ensure that all items are included. If any items are missing or damaged, contact your sales representative or Sierra Video Systems directly.

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## Rear Module Installation (Optional)

If you are installing the card in a 8310-C-BNC or 8310-BNC frame (one with a 100 BNC rear module installed across the entire back plane), skip this section.

If you are installing the card into a slot with no rear module, you should have ordered and received one of the ADC-124-A module. You will need to install it in your 8310 frame before you can connect cables.

Use the following steps to install a rear module in an 8310 openGear™ frame:

1. Refer to the openGear™ 8310 frame Owner's Manual, to ensure that the frame is properly installed according to instructions.
2. On the rear of the 8310, locate the card frame slot.
3. As shown in Figure 2, seat the bottom of the rear module in the seating slot at the base of the frame's back plane.

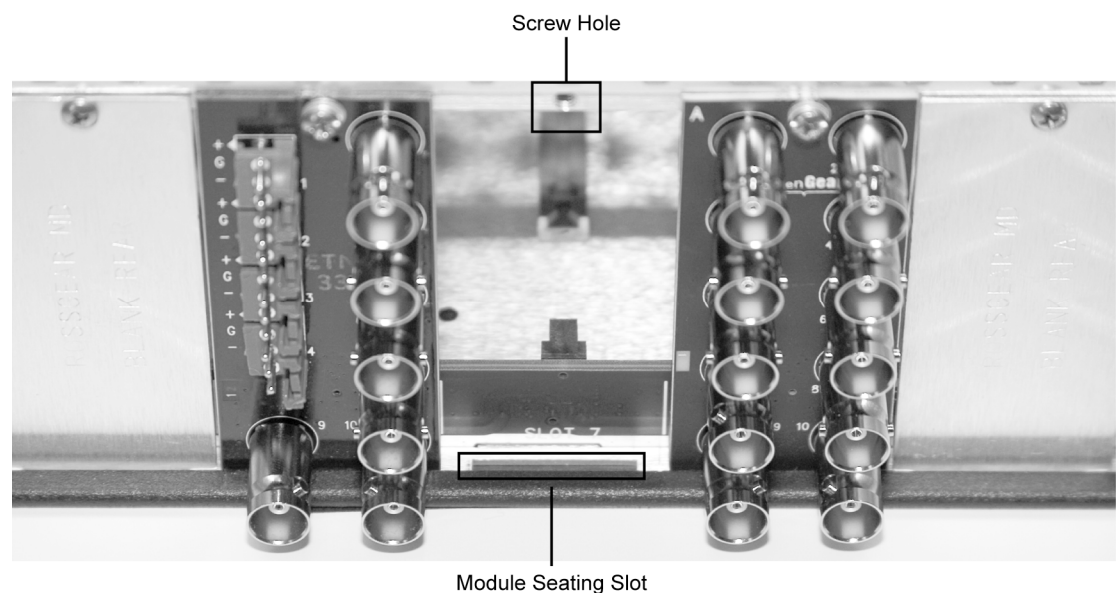


Figure 2. Rear Module Installation

4. Align the top hole of the ADC-124-A with the screw hole on the top edge of the 8310 back plane.
5. Using a Phillips driver and the supplied screw, fasten the rear module to the 8310 back plane. Do not over tighten.

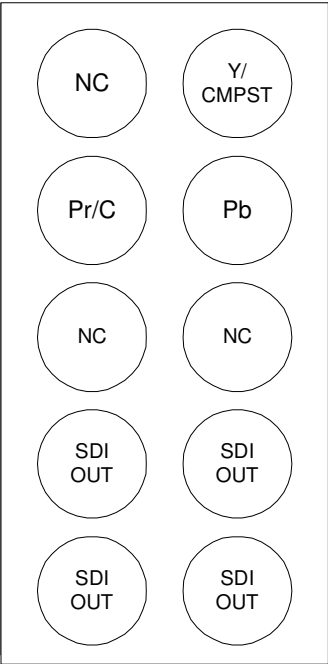
All modules are installed using the same method above.

The following section contains a drawing of the ADC-124-A module.

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# Rear Module Available for ADC-124

Figure 3. BNC Designations for the Card Rear Module available for the ADC-124.



**ADC-124-A**

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## Board Installation

Use the following steps to install the card in the openGear™ 8310 frame:

1. Refer to the Owner's Manual of the openGear™ 8310 frame to ensure that the frame is properly installed according to instructions.



### Warning

Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using convection cooling.

2. After selecting the desired frame installation slot, hold the card by the edges and carefully align the card edges with the slots in the frame. Then, fully insert the card into the frame until the rear connection plugs are properly seated on the midplane and rear modules.

This completes the procedure for installing the card in the openGear™ 8310 frame.

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## Software Version

- ❑ This manual is written for software release number 2.0.
- ❑ To view the current software release number of your ADC-124 check the information submenu on the front edge controls or the card info menu in DashBoard.
- ❑ To upgrade your ADC-124 software, go to the download page at [www.sierravideo.com](http://www.sierravideo.com) to download the latest release, and upload the file through DashBoard (see DashBoard user manual, 3-5).

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# Card Control and Status

## Card Status

The card indicates the status of the input signal with the four blue LEDs labeled with the different supported formats (1080, 720, 625, 525). When the card has locked to a particular input format, that LED will be illuminated. When the card has not locked to a particular video format, the card will search all possible formats, and the lights will cycle rapidly.

## Menu Navigation

The card can be configured from a menu system built in to the front card edge. This provides an intuitive and easy to use method for exploring and using the features of the card.

The menu is navigated by using the toggle switch and the two push buttons. The lower button is the “Enter” button to enter a submenu, and the upper button is the “Exit” button to exit a submenu. Moving the toggle switch up or down moves up or down in menu choices, and pressing the buttons moves in or out of sub menus.

The menu LEDs will illuminate from top to bottom to indicate increasing depth in the menu.

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# Menu Structure

## Video Submenu

Menu Structure			Parameter Type
Vid	Proc	Unty	Proc Unity
		Gain	Proc Gain
		Lift	Proc Lift
		Sat	Proc Sat
		Phas	Proc Phase
	Dec	SDIN	Decoder SD input
		HDIN	Decoder HD input
		PED	Pedestal - SD Setup
	Sorc		Set SDI or analog priority

### ***Proc Unity***

Resets all of the proc controls to unity value.

### ***Proc Gain***

This is Luma (Y channel) gain, expressed as a percentage. It ranges from 0.0% to 200.0% in 0.1% steps.

### ***Proc Lift***

This is Luma (Y channel) offset, expressed as an actual video value ranging from -1024 to 1024. If set to 0 no change is made. If set to 1024 absolute black (value 004) becomes absolute white (value 3FB). If set to -1024, absolute white becomes absolute black.

### ***Proc Saturation***

This is Chroma (C channel) gain, expressed as a percentage. It ranges from 0.0% to 200.0% in 0.1% steps.

### ***Proc Phase***

This is Chroma (C channel) phase adjustment, expressed in degrees, ranging from –360 to +360 in steps of one degree.

### ***Decoder SD Input***

Selects the input format for SD analog video. This must be changed to reflect the analog video format on the input for the ADC-124 to lock correctly. Valid SD formats are GBR, Component SMPTE, Component MII, Component Betacam, Component Y/C, and Composite.

### ***Decoder HD Input***

Selects the input format for HD analog video. The user must select between GBR and YPbPr for the ADC-124 to lock to the input correctly.

### ***SD Pedestal (Setup)***

Selects between 0 IRE and 7.5 IRE of setup (pedestal) on the input analog SD signal. This tells the card how much setup needs to be removed from the input.

### ***Select Default Source SDI / Analog***

Selects the input that has priority when both SDI and Analog inputs are detected.

## ***Display Submenu***

Menu Structure		Parameter Type
Disp	H/V	Display Orientation
	BRGT	Display Brightness

### ***Display Orientation***

This parameter lets you change the orientation of the display. “Vert” makes the characters look correct when the cards are mounted in a 2 RU frame like the 8310. “Horz” makes the characters look right in a horizontal frame.

### ***Display Brightness***

This parameter allows you to set the standard output brightness of the menu display. It is a percentage of maximum brightness.

## ***Preset Submenu***

MENU STRUCTURE		Parameter Type
Prst	Slct	Select Preset
	Save	Save Settings
	Load	Load Settings
	Fact	Restore Factory Settings

### **Select Preset**

Select from one of the five saved presets.

### **Save Settings**

In this parameter, move the toggle switch up to save the settings to the card persistent storage.

### **Load Settings**

In this parameter, move the toggle switch up to load the saved settings and make them active.

### **Restore Factory Settings**

In this parameter, move the toggle switch up to make the factory default settings active, and make the stored settings equal to the factory settings.

## **Information Submenu**

Menu Structure		Parameter Type
Info	+POW	Positive Watts Consumed
	-POW	Negative Watts Consumed
	SWR#	Software Release Number
	SWB#	Software Build Number

### **Positive Watts Consumed**

A read only indication of power consumed by the card from the frames +12V rail.

### **Negative Watts Consumed**

A read only indication of power consumed by the card from the frames +-7.5V rail.

### **Software Release Number**

A read only indication of the software release number. A higher number is newer release of software.

### **Software Build Number**

A read only indication of the software build number. Software build number is an internal indicator used by Sierra engineers to differentiate different software builds.

## **Factory Default Settings**

The factory default settings are as follows

- 1) The proc module is enabled, but all parameters are set to unity.

# Remote Control

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## In This Chapter

This section provides a detailed explanation on using remote control functions with your card.

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## DashBoard Control System Software

The DashBoard Control System enables you to monitor and control openGear™ frames and controller cards from a computer. The DashBoard software and manual can be downloaded from the Sierra Video Systems website ([www.sierravideo.com](http://www.sierravideo.com)).

### *Using the Menus and Menu Descriptions*

You must first install the DashBoard Control System software on your computer. Refer to the *DashBoard User Manual* for software installation procedures and for using the DashBoard interface.

The following pages list the parameters from the menu tabs available in the DashBoard software when connected to a ADC-124.

Menu	Item	Format	Description
<b>Card Info (Read-only)</b>	Product	ADC-124	The product name
	Manufacturer	Sierra Video Systems	The manufacturer of the product
	Software Release Number	###	The release number of the firmware in this card
	Software Build Date	###	The internal build number of this software
	Software Build Time	###	The date and time the software was created
	+12 V Power Rail	#.## W	Positive Supply Power
	-7.5 Power Rail	#.## W	Negative Supply Power
	Video Input Standard	#####	Detected Video Standard on SDI or Analog Input
	Reference Standard	#####	Detected standard of selected reference.
	SSN	#####	Displays the Silicon Serial Number of the card.

Menu	Item	Format	Description
<b>Presets</b>	Parameter Save	Confirm	Saves the parameters as preset.
	Parameter Load	Confirm	Loads parameters previously saved.
	Restart Parameters to Factory Default	Confirm	Will load factory presets and overwrite the save.

Menu	Item	Format	Description
<b>Video Signal Controls</b>	SD Input Type	Composite	Selects the format of input SD analog video, so the decoder can properly decode the signal.
		Y/C	
		YPbPr BetaCam	
		YPbPr MII	
		YPbPr SMPTE	
	HD Input Type	GBR	Selects the format of input HD analog video.
		YPbPr	
	SD Composite Contains	0.0 or 7.5 IRE of Setup	Specifies the amount of setup (pedestal) in the input video. It will be removed by the decoder.

Menu	Item	Format	Description
<b>Video Proc</b>	Video Gain	Range 0-2000	Gain applied to Y (Luma). 1000 is unity.
	Video Lift	Range (-999) – 999	Lift applied to Y (Luma), in 10 bit code value.
	Color Gain	Range 0-2000	Gain applied to C (Chroma). 1000 is unity.
	Color Phase	Range (–360) – 360	Phase of C (Chroma) in degrees.
	Reset to Unity	Confirm	Resets all of the proc controls to unity.

# Technical Specifications

Table 4. Card - Technical Specifications

Category	Parameter	Specification
<b>Analog Video Input</b>	Number of Inputs	3
	Input Type	Differential, Common Mode Rejection (5V AC)
	Video Inputs	HD: Component YPbPr and RGB SD: Composite, Component YPbPr (BetaCam™, MII™, SMPTE/N10), RGB, and Y/C
	Conversion Bit Depth	12-Bits
	SD Color Separation	5-Line Adaptive Comb or Notch Filter
	Frequency Response	HD: Y- 0-30MHz ± 0.25db PbPr 0-15 MHz ± SD: Y- 0-30MHz ± 0.25db PbPr 0-15 MHz ±
	Differential Phase	SD: < ±0.4° typical
	Differential Gain	SD: < ±0.4% typical
	Noise	< -64dB (Luma Flat Field) < -61dB (Luma Ramp)
	Analog Front End Crosstalk	Within Noise Floor Measurement
	Return Loss	> 20dB to 30MHz
<b>Serial Digital Video Outputs</b>	Number of Outputs	2:HD/SD-SDI BNC per IEC 60169-8 Amendment 2
	Impedance	75Ω
	Return Loss	> 15 dB at 5MHz – 270MHz > 12 dB at 270MHz – 1.485GHz
	Signal Level	800 mV ±10%
	DC Offset	0 Volts ±50 mV
	Jitter	HD: < 0.15UI (all outputs) SD: <0.06UI (all outputs)
	Overshoot	<0.2% of amplitude
<b>Other</b>	Total Power Consumption	10W
	Warranty	Five Year Transferable

Specifications are subject to change without notice.

# Service Information

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## In This Chapter

This chapter includes the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

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## Troubleshooting Checklist

Routine maintenance to this openGear™ product is not required. In the event of problems with your card, the following basic troubleshooting checklist may help identify the source of the problem. If the module still does not appear to be working properly after checking all possible causes, please contact your openGear™ products distributor, or the Technical Support department at the numbers listed under the “Contact Us” section at the end of this manual.

1. **Visual Review** — Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the module, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check** — Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Reseat the Card in the Frame** — Eject the card and reinsert it in the frame.
4. **Check Control Settings** — Refer to the Installation and Operation sections of the manual and verify all user-adjustable component settings.
5. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
6. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
7. **Module Exchange** — Exchanging a suspect module with a module that is known to be working correctly is an efficient method for localizing problems to individual modules.

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# Sierra openGear Warranty

## A. General

Buyer assumes all responsibility for ascertaining the suitability of Sierra Video Systems (hereinafter "SVS") products for Buyer's intended use. No product sold by SVS is designed or manufactured for use in any manner or under any conditions other than those described in SVS's instruction manuals and other printed material for each particular product. If any product is used or applied in a manner or under conditions not specifically authorized by such written materials or if any product is used by unqualified or improperly trained personnel, Buyer agrees that SVS shall have no liability of any kind arising from such use, and Buyer agrees to indemnify and hold SVS harmless from any claims of third parties arising from such use, and Buyer shall provide SVS with counsel of SVS's choice to defend against such claims.

## B. Limited Warranty

1. This warranty applies only to the original purchaser and is non-transferable. This warranty begins on the date of purchase and will be in effect for five (5) years for new equipment or and for three (3) years for "Factory Refurbished" equipment. Buyer must obtain a Return Material Authorization ("RMA") number from SVS prior to returning a product for repair. If, in SVS' sole discretion, the product is found to be defective during the term of this warranty, SVS will at its option: (a) provide free replacement parts, and/or (b) repair the unit at an SVS facility. During the warranty period, SVS will make every reasonable effort to support critical emergencies by supplying no-cost loan equipment while the defective unit is being repaired. SVS will provide replacement parts and/or factory service at no charge. Buyer bears the cost of shipping products returned to SVS under this warranty. SVS will bear the cost of shipping repaired products or replacement parts to the Buyer.

This limited warranty shall not apply to any of SVS's goods which have been altered or which shall have been subjected to misuse, mishandling, improper storage or negligence. The aforementioned provisions do not extend the original warranty period of any goods which have been replaced by SVS. This limited warranty shall not apply to any goods not of SVS's manufacture, Buyer to be entitled only to the warranty set forth in the original manufacturer's limited warranty.

THIS LIMITED WARRANTY IS EXPRESSED IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON SVS'S PART.

SVS neither assumes nor authorizes any other person to assume for SVS any other liabilities in connection with the sale of products of its own manufacture.

2. SVS's liability hereunder on any claim of any kind, except as set forth herein for any loss, injury to person or property or damage, shall in no case exceed the price allocable to the goods which give rise to such claim.

3. In no event shall SVS be liable for any damages or injuries to person or property if any goods do not meet the above limited warranty, including, without limitation, incidental expenses or consequential or special damages, except as set forth in such limited warranty. The foregoing states the exclusive remedy of Buyer and the exclusive liability of SVS for any breach of the foregoing limited warranty.

## C. Cancellation

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Except as provided in paragraph B immediately above, all sales are final, and Buyer may cancel this order or return products only upon written consent of SVS.

#### **D. General**

A. In the event of a breach of any of the terms hereof, the non-breaching party shall be entitled to recover all of its costs, fees, and expenses, including, without limitation, reasonable attorney's fees, from the breach party incurred as a result of such breach, regardless of whether or not a suit is actually filed to enforce the terms hereof.

B. The provision hereof shall be governed by the laws of the State of California (excluding its choice of law provisions).

C. The headings are for convenience only and do not limit or amplify the terms and provisions hereof.

D. In case any one or more of the provisions set forth herein shall be held to be invalid, illegal, or unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

E. No waiver, alteration, or modification of any of the provisions hereof shall be binding unless in writing and signed by an authorized Officer of SVS.

#### **NOTE:**

All products returned to SVS for service must have prior approval. Return authorization requests may be obtained from your SVS dealer.

# Ordering Information

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## ADC-124 and Related Products

Your **ADC-124 HD/SD Analog to Digital Converter** is a part of the openGear™ family of products. Sierra Video Systems offers a full line of openGear™ terminal equipment including distribution, conversion, monitoring, synchronizers, encoders, decoders, embedders, and de-embedders, as well as analog audio and video products.

### ***Standard Equipment***

- **ADC-124** HD/SD Analog to Digital Converter
- **ADC-124-OM** HD/SD Analog to Digital Converter Owner's Manual

### ***Optional Equipment***

- **ADC-124-OM** HD/SD Analog to Digital Converter with Owner's Manual (additional Owner's Manual)
- **ADC-124-A** openGear™ Rear Module compatible with ADC-124 (10 BNC connector)
- **8310-C** Digital Products Frame and Power Supply with Cooling Fans (2RU, holds 10 cards)
- **8310-C-BNC** Digital Products Frame and Power Supply with fixed 100-BNC Rear Module and Cooling Fans. (2RU, holds 10 cards)
- **MFC-8310-N** Network Controller Card (Additional)

***Notes:***

# Contact Us

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## Contact Sierra Video Systems

PHONE	General Business Office and Technical Support	530.478.1000
	Fax	530.478.1105
E-MAIL	General Information	Info@sierravideo.com
	Sales Information	Sales@sierravideo.com
POSTAL SERVICE	Sierra Video Systems	P.O. Box 2462 Grass Valley, CA 95945 USA

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